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FROM MONOCENTRISM TO POLYCENTRISM OF RUSSIAN CITY

Abstract: *The article concerns the results of studying Krasnoyarsk structure planning as a discrete entity. The urban territory is dismembered by large industrial zones, communal and warehouse territories, railway exclusion zones, complex terrain and big rivers which caused its "patchwork" character. There appeared the problem of discrepancy between the monocentric idea of the general plan of the city development and the actual processes taking place in the city. The separate territories of the city became the object of the research. These urban territories due to their internal characteristics and easily detected boundaries are able to exist as self-sufficient urban units. Allocation of such units, their description, analysis and systematization have made it possible to identify the basis for developing the necessary program for transforming each of these territories into a comfortable urban space. More than 30 urban units were identified and analyzed in accordance with a number of parameters: function, planning, architectural and organizational concepts, economics, social sphere and environment. It has been detected that the main characteristic of each unit is its multicomponent plurality of subjects and objects, and natural and anthropogenic complexes.*
Keywords: *self-sufficient urban development unit, comfortable urban space, targeted development scenario, polycentric model.*

Introduction

Active processes of urban community development, such as forms and structure of consumption, mobility of capital and population, intensification of information and cultural exchanges, self-organization of residents and other phenomena today, determine the processes of transformation of the Russian city. Against this background unevenness and heterogeneity of the development of territories are intensified, urban fabric becomes more complicated, the needs of population are modified, and communication flows are transformed. These phenomena have peculiar characteristics in Siberian cities due to historical, political, economic and cultural factors. This is manifested in the structural organization of Novosibirsk, Krasnoyarsk, Irkutsk, Chita, etc. In this connection, traditional approaches to the study and formation of the urban environment can not cover the whole spectrum of phenomena taking place in modern conditions and this raises the need to consider the planning structure of the Siberian city on the basis of other methodological principle.

Methodology

The solution for this problem is seen in dismemberment of the Siberian city structure into separate planning elements – urban planning units – which are fixed by explicitly expressed borders not described by the state regulatory documents. These borders can be of natural origin (river, relief, forest) and of anthropogenic character (railway, industrial zones, motorway). The urban structural elements should be more or less separate planning areas, differing in the degree of isolation, number of external links, population, type and richness of infrastructure systems, etc. It is interesting that these elements are so naturally manifested, e.g. in the urban structure of Krasnoyarsk, that it leaves no doubt about the possibility (and, more often, the need) of urban development through building autonomous and self-sufficient territories in terms of comfort of

living of a certain level. The self-sufficiency of such territories – urban planning units –is a requirement of comfort and rational organization; but not isolation. Self-sufficiency in this case is understood as necessary characteristics for balanced functioning of a particular urban area on the basis of flexible infrastructure, and a complex of social and cultural units.

Thus, today separate urban areas should be the object under consideration, the separate urban areas convenient for living, work, recreation and creative activity. It is assumed that there will be a decrease in commuting among the population, the notion "depressive" residential areas will disappear, there will be a balanced demand for housing, public service facilities, transport, targeted investment and construction. Taking into account the residents' preferences (in terms of the time spent in transport, convenience of locating objects and their compatibility, traffic intensity, accommodation conditions, etc.), it will be possible to identify the capacity, main directions of transportation, stability of consumer flows, and on this basis to build a system of multifunctional urban nodes while individually modeling their content and structure. The number of service centers and separate constructions of any profile is established as a result of a careful analysis of urban development, consumer demand and analysis of competitive environment. In this regard, ensuring the comfort of living in each territory should be based on flexible structuring and a complex of social and cultural potential. Inside each self-sufficient urban planning unit there should be comfortable housing, variety of workplaces, cultural objects and recreation areas. The unity of the citywide structure will be provided by engineering and transport communications and maintained by a system of green spaces. This is possible with the formation of a city-wide multifunctional spatial model in which the main methodological principle will be policentricity. Only in this case the urban structure will lose its total hierarchy and static character, become branched out, will be freely combined with complex social, cultural and spatial patterns of urban existence and development.

Measurement and analysis

The world practice has examples of solving similar problems. The famous Le Grand Pari(s) programs, the principle of "point interventions" in Barcelona, "Lerner triangle" in Curitiba, renovation phases of Lyon, comprehensive plan for the joint development of public space and public transport in Strasbourg, the "many small steps" strategy in Copenhagen and many others show a range of possibilities for transforming the urban environment. The concepts of New Urbanism, Traditional Neighborhood Design, Enviromentalism, Smart Growth, Transit-Oriented Development, Sustainable Development allow us to comprehend principles and find priorities for the development of modern Russian cities. The review of Russian scientific publications devoted to the problems of urban space reorganization emphasizes the timeliness and urgency of raising the problem of transition from a monocentric urban structure to a polycentric one. One can consider the ideas of A.E. Gutnov ("frame-cloth" binary model), L.B. Kogan (typology of social spaces), G.A. Maloyan (urban planning module), V.L. Glazychev (units in the dictionary of urban development), A.A. Pravotorova (algorithm of functional development of the urban area through the "knot", "line' and "fabric" categories), etc. The study of the latest research results in the field of architecture, sociology, cultural studies, urban studies shows a great interest of Russian specialists in structuring the urban space in accordance with the new principles. The review of the recent domestic scientific and practical developments shows that today there have appeared interesting approaches and appropriate tools for working with urban areas in new conditions.

Thus, A.A. Vysokovsky, while developing the theory of "uneven regional" spatial urban structure (Vysokovsky, 2007), states that the city consists of special complex units – *nodal areas*, the presence of which determines existing unevenness and heterogeneity of urban fabric. This approach provides opportunities for the targeted development of separate intensively used urban areas with good locations within a citywide or district planning system.

T.V. Filanova (Filanova, 2008) believes that the basis for the differentiation of urban area should be the unity of two components of the urban organism – social and spatial, with the

leading role of the social principle. In this regard the author suggests that the environment of a major city is differentiated into *local social and territorial entities*, the areas where the population tends to concentrate nearer to the centers (social nodes) formed in the course of their natural functioning. The boundaries of such formations are determined by identifying areas of social activity within the everyday life of the population.

M. S. Kalmykov (Kalmykov, 2006) speaks about the urgency of introducing a new planning unit into the scheme of functional zones of the urban general plan – *a multifunctional urban territory*. The author suggests to accept the presence of a transport hub and existence of a clearly defined social function as criteria for defining such territories. This approach provides an opportunity for the development of a specific territory on the basis of interconnection of communication, territorial, social and economic tasks with specific characteristics and development forecasts.

S. Kolesnikov (Kolesnikov, 2006) believes that the current stage of major Russian city functioning is the emergence of large architectural and urban planning entities capable of accumulating a large number of functional processes, transport and communication flows, large investments and solving major social and urban tasks. It is connected with the targeted formation of special zones – *highly urbanized multifunctional units of the urban structure* of various orientation. The author proposes an architectural typology of such nodes, methods for their detection, methods of complex analysis and principles for an optimal structure formation.

A.E. Gashenko (Gashenko, 2012) considers an approach to the development of urban areas based on the recognition of the intrinsic value of the urban environment of each part of the city, regardless of the size, location, ideological, cultural and historical causes of its occurrence. A detailed study of the peculiar features of the existing urban environment of particular territory makes it possible to describe the city as a collection of different environments, each of which is regarded as a value. The author puts forward the hypothesis of *an integrated local urban planning formation* – an element of the urban structure, within the conditional boundaries of which the urban planning properties and environmental characteristics are more uniformed and revealed in a more concentrated manner than beyond its boundaries.

Thus, from the point of view of the "anatomy of urban organism", the approaches considered contain a conceptual basis grounded on the idea of structuring the urban tissue into separate urban planning entities capable of supporting actively emerging polycentricity of Russian cities. From this point of view, *self-sufficient urban planning units* are planning formations with heterogeneous structure having definable boundaries and centers of consumer attraction. The obtained theoretical database has been used in the research work which includes a number of East Siberian cities involving Krasnoyarsk.

The planning structure of Krasnoyarsk was originally characterized by discreteness. This is due to extensive methods of urban development prevailing in the past years. The housing construction was carried out by using suburban land, and departmental approach that caused disorderly urban development. The urban area has been dismembered by such inclusions as large industrial zones, communal and warehouse territories, railway zones, pronounced terrain relief, large rivers with tributaries. These factors have caused "patchwork" intersection of the urban territorial organization. There was a "spreading" urban development; the distances from the city center to peripheral areas increased, which, in combination with the traditional network of multi-route low-speed public transport, led to negative consequences. Today's Krasnoyarsk development illustrates increasing decentralization process and strengthening of centrifugal character of peripheral territories. In combination with the existing monocenter of the city core, this situation is unstable and may lead to such threat as functional "separation" of the districts, which in some cases has already occurred. This is a consequence of one major problem. There is a contradiction between the dynamics of the city's urban planning development and its established infrastructure organization. These two systems have little correlation with each other. The city's infrastructural organization (public service, transport system, engineering support, etc.)

is focused on a mono-center, it cannot "work" in terms of discreteness of the urban structure. Attempts to bring these systems in line with the existing situation are only strengthening, and will continue to intensify the service network fragmentation, transport problems of peripheral territories, and technological complexity of urban engineering. The imbalance between the urban systems of Krasnoyarsk, which now is manifesting itself, determines impossibility of its further development as a monocentric structure. New approaches are needed that are focused on specific features of existing territorial organization and of urban life as well. The discreteness of Krasnoyarsk planning structure dictates the city to use the polycentric approach to its further development (Fig. 1).

The undertaken research is aimed to structure the territory of Krasnoyarsk, to identify urban areas, considered as self-sufficient urban planning units, to describe, analyze and systematize them. The preliminary stage of the work has been devoted to the most important issue of revealing the boundaries of such formations. In this study the boundaries of two categories are applied: 'insurmountable" and "surmountable". Insurmountable borders are obstacles such as railway, large industrial zone, motorway, river area, forest, and specially protected areas. The category "surmountable borders" refers to physical possibility of crossing obstacles, but it reflexes the residents' mental reactions ("mine" and "not mine"/"owned by someone else", "convenient" and "uncomfortable"). We have managed to detect more than 30 urban planning units.

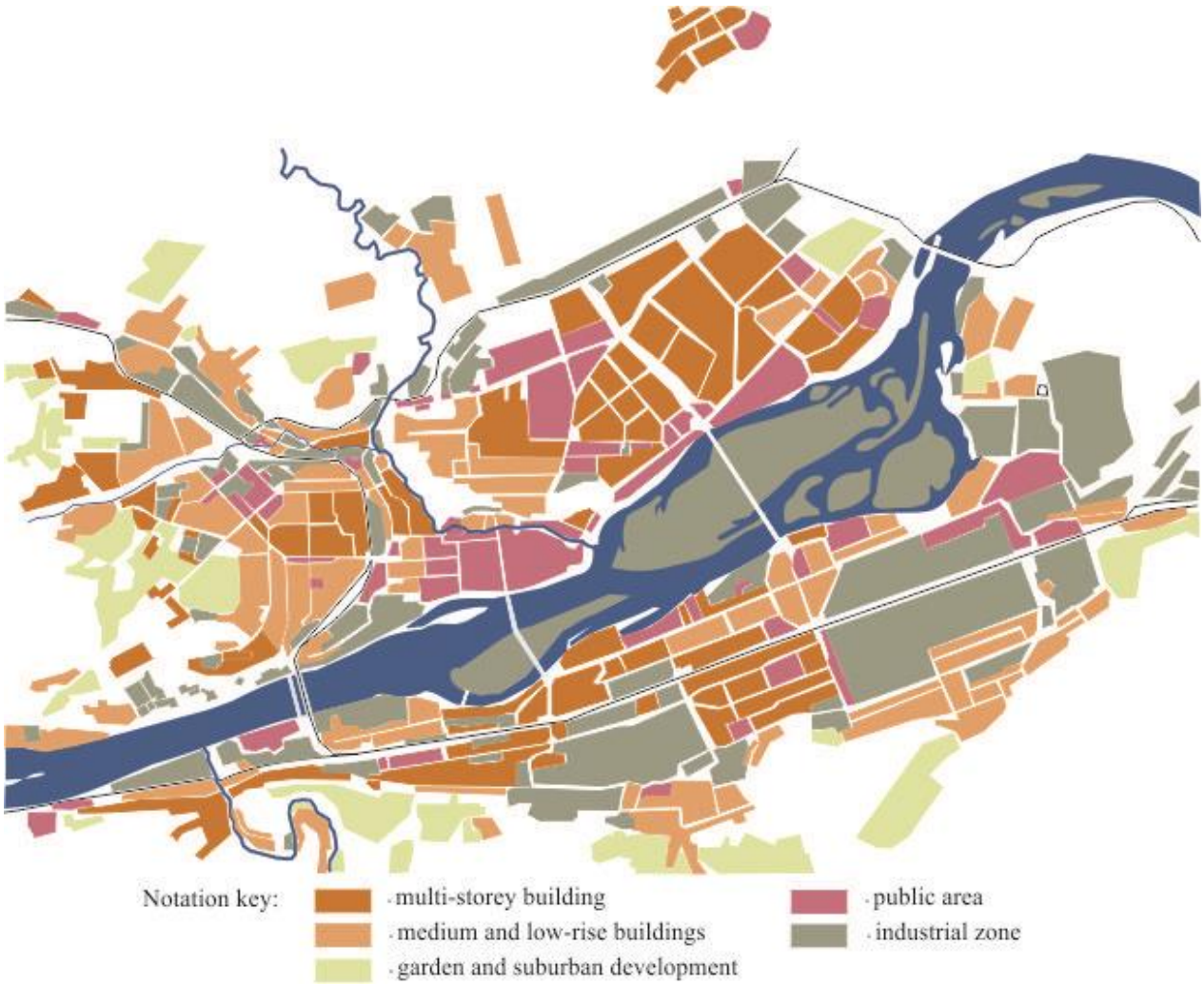

Figure 1. Krasnoyarsk planning structure: the existing discrete character

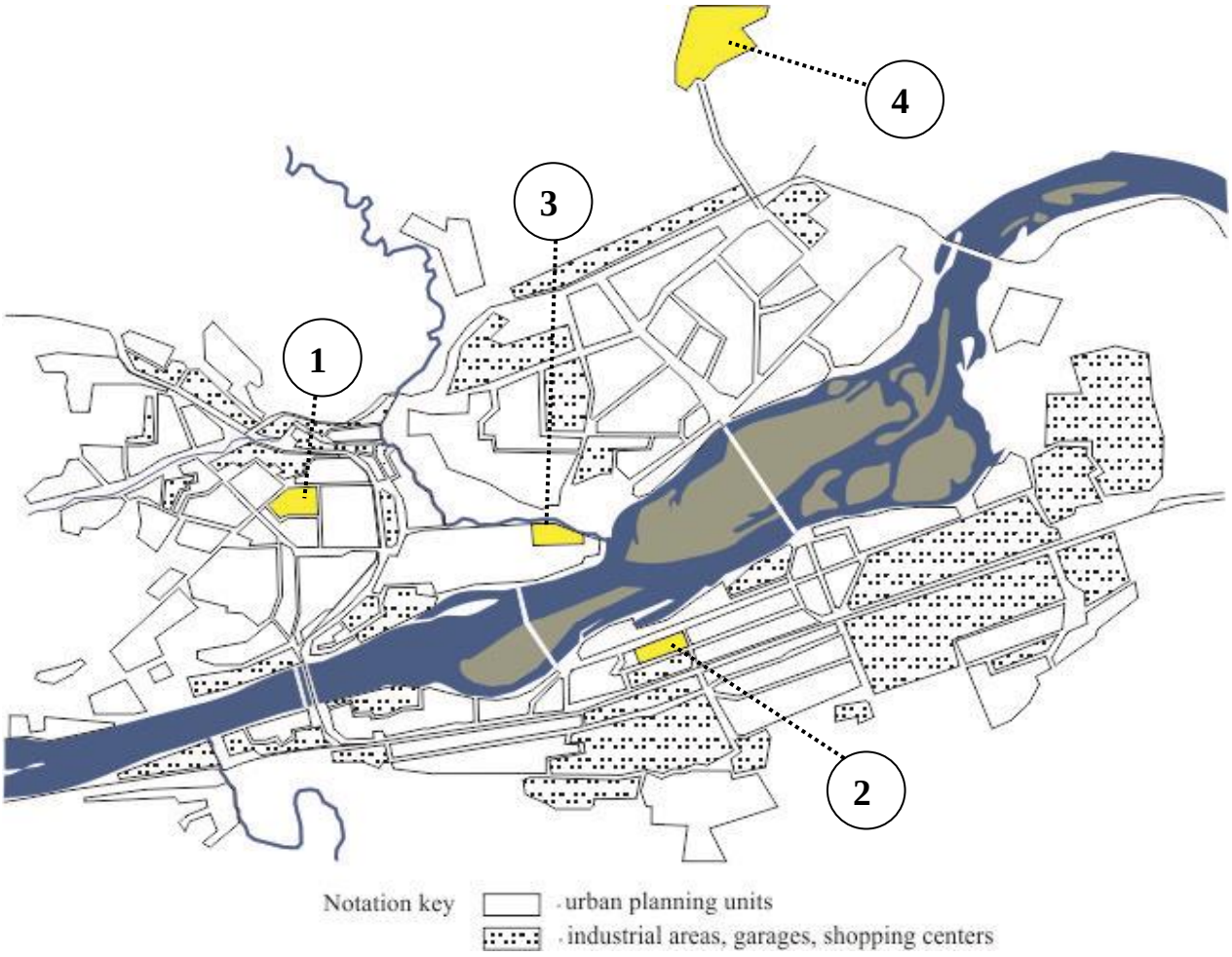

Figure 2. Detecting Krasnoyarsk urban planning units

The analysis of allocated territories (town-planning units), in accordance with the number of basic parameters of functional, planning, and architectural spatial organization, has showed the opportunities of preliminary systematization and classification. Thus, in accordance with the planning structure, the following options are distinguished:

- area: large (over 600 thousand sq. m.), medium (over 300 thousand sq. m.), small (from 70 thousand sq. m.);
- configuration: compact, linear, complicated;
- principles of development: introvert, extravert, polyvert;
- time needed to reach to the core of the city center: remote districts (60-90 min.), middle (35-40 min.), close to the core of the city (15-20 min.);
- connectivity with other territories: isolated (minimum of communication links), relatively isolated (sufficient communication connectivity), end-to-end connectivity;
- ratio of residential and industrial areas: absence of industrial zones; industrial zone adjoins the district and exists as a border; industrial zone occupies a small part; industrial zone occupies a significant part;
- configuration of public space: compact, linear, linear-nodal, linear-angular.
- According to the functional structure the following models are distinguished:
- availability of services: sufficient (sports, culture, trade, service), incomplete (trade and sport, trade and culture), insufficient (local trade);

- location of service facilities: even placement of objects across the territory, uneven placement of objects within the manifested concentration zones;
- social and functional activity: high social activity (constant population flows, saturation of the territory by universities, hospital centers, large entertainment or sports complexes), high business activity (pulsating population flows, office areas, industrial and semi-industrial enterprises), periodic population flows (availability of dachas, recreation and sports areas, boarding houses on the territory), minimum level of public activity (there is no objects of the citywide importance within the area);
- specialization of the districts in terms of social functions: explicit specialization (scientific center, sports and recreation center, recreation area), mixed specialization (areas with local recreation areas, hospital complexes, youth and children's centers);
- construction values: historical and cultural monuments, memorial sites, modern art objects and unusual buildings;
- interaction with the landscape: clearly pronounced, easily detected on the city scale natural landscape; the area has natural landscape elements of a local character; the area has no elements of natural landscape character;

The accomplished research allows drawing a conclusion that the considered aspects are in a complex and diverse interaction. Taking into consideration the main task of the study it is necessary to identify the main criteria that allow us to focus while choosing the direction of transformation of each territory in conditions of multifactor design.

The question of quality of the urban environment within each urban planning unit, its self-sufficiency, in our opinion, is related to the category of "accessibility". It means:

- spatial accessibility, implying pedestrian reach of any point of attraction within the area;
- functional accessibility, reflecting the neighborhood (housing, workplaces, social and cultural facilities, and recreation areas);
- availability over time and space, ensuring a simple and rapid movement from the center of one area to the center of the other.

Since each territory is unique by definition, the challenge is to identify its "face" for each urban planning unit. This is ensured by the targeted approach, both at the stage of assessing the current situation, and at the stage of determining the necessary program for transforming each of the territories into a comfortable and efficient urban space. The goal is to ensure self-sufficiency of the territory on the basis of a balanced set of vital functions and revitalization of the compact pedestrian urban environment. For the residents it means an opportunity to work, play sports, meet friends next to their house, and have rest for the whole family in the fresh air without leaving the limits of the metropolis. Interconnection of self-sufficient urban planning units with each other by high-speed transport communications ensures the organization of urban territory according to the polycentric model (system).

Consideration of self-sufficient urban planning units as unique planning formations requires recognition of the value of the urban environment of each of the parts of the city, regardless of its location, current state and prospects for development. Identification, mapping and studying of such town-planning units changes the project attitude toward the urban planning environment and makes it more substantial and meaningful. To study local phenomena a survey on the specific territories of Krasnoyarsk has been undertaken, which makes it possible to identify environmental features, the "spirit of the place" and values that are important to the residents. One of the considered urban areas is located between Svobodny prospect, ulitsa Lado Ketskhovely, and ulitsa Novosibirskaya (Fig. 3). These streets (ulitsa) are intense and busy city highways and are defined as rigid borders. The territory, accordingly, does not have the resources of extensive development.

The area is characterized by various constructions, which divide the territory into parts with low-rise and medium-rise blocks. Each of the parts has service facilities of local significance, well-marked courtyard spaces, and pedestrian passages. But at the same time, the number of service facilities is estimated as insufficient, there are spontaneous parking spaces, and the

absence of public areas is observed. The opinion poll of the residents showed that the residents are positive about low-rise and medium-rise of the building (3-5 floors), the type of houses (pitched roofs, bay windows, decorative elements), abundance of greenery (the park on the one side, the square on the other side, trees all around); the territory is comfortable for pedestrians, there are low-speed internal streets, and the territory is characterized by established close neighbor ties (Fig. 4). Thus, the main value of the territory is intimacy of the environment, friendliness of general atmosphere, proportionality of the environment elements to people. The program of transformation should be based on principles that preserve and increase these qualities of the environment.

Figure 3. Detecting the urban planning unit1

Figure 4. Krasnoyarsk: low-rise blocks within urban planning unit 1

As an urban planning unit, the right bank territory is allocated within Krasnoyarsky Rabochy prospect, ulitsa Vavilova and ulitsa Kornetova, and Yakorny lane (Fig. 5.). Rigid borders are determined by the intensity of highways and the railway. The territory has linear character – it is located along the street with active traffic.

The territory is characterized by stylistic, structural and spatial uniformity. The appearance of residential buildings throughout the territory is the same (in architecture, form, and color) and does not depend on the location (whether the building is inside the district or faces a busy city street). In this regard, the perimeter character is detected, which is not provided by the original architectural and urban planning concept of the residential area. The perimeter character is manifested not by specific architectural elements of the buildings facing the streets, but by the functional saturation of their first floors. This is confirmed by the abundance of service facilities here for a variety of purposes. Inconsistency of architectural and design solutions (amateur entrance spaces, bright signs, banners, etc.), lack of organized parking spaces, depleted landscaping contribute to the organizational chaos and complexity of adjacent pedestrian areas.

The quality of the environment of interior parts in the residential area is assessed by residents as favorable. They admit the openness of the space due to predominance of residential buildings of medium height, some randomness of gardening (considered as natural), restrained color scale (Fig. 6).

Figure 5. Detecting the urban planning unit 2

Figure 6. Krasnoyarsk: urban planning unit 2

However, there is a general inconsistency of the areas, worn-out equipment, broken asphalt, unauthorized parking in yards. Garages, communal storage facilities and yard gas storages are randomly located inside courtyards and in dead-end alleys. *The value of this district is spatial openness, low building density, a combination of freedom for pedestrian movement in combination with the absence of extraneous pedestrian flows*. The program of transformation should be based on overcoming the monotonous homogeneity of constructions and spatial depletion that complicates the formation of the overall structural integrity of the district.

The territory in the central part of Krasnoyarsk has been defined and studied as an urban planning unit. The territory limited by ulitsa Konstitutsii, ulitsa Lenina and ulitsa Parizhskoy Kommuny is an example of recreational functions predominance (Fig.7).

The constructions facing ulitsa Lenina are characterized by small scale, monotony, general deterioration of buildings and have no architectural features of citywide importance.

The closeness to the river and the coastal park zone on the northern side, the natural terracing of the territory, the rational placement of groups of dwelling houses, the location of basic service facilities in walking distance make it possible to assess the area as comfortable for living. However, there is a problem with parking spaces, children's playing grounds in yards, pedestrian sidewalks, and depleted landscaping (Fig.8).

Figure 7. Defining urban planning unit 3

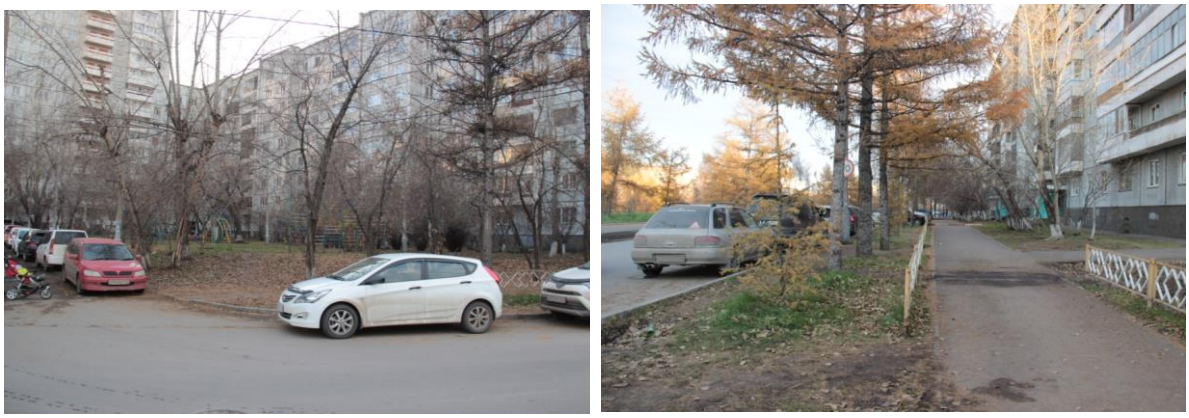

Figure 8. Krasnoyarsk: urban planning unit 3

The residents consider closed character and isolation of the territory from the manifestations of a large city such as noise, gas pollution, high-speed traffic of the most significant streets of the city the main value of their district. The basis for the transformation program should be the use of relief, supporting internal pedestrian areas with links, preservation of exits to coastal recreation areas, and functional convenience of public services.

The urban planning unit known as Solnechny district is one of the most rapidly developing areas in Krasnoyarsk (Fig. 9).

The main feature of the area is its remoteness. This circumstance determines specific character of its boundaries. From the southeast it is a transit regional highway, and from the northwest there are open territories on which the district development is possible in the future. The residents evaluate the distance factor in two ways. On the one hand, they like living outside the metropolis (no noise, gas pollution, huge traffic, etc.); on the other hand, the distance makes a large number of people to commute to work or school, theater or museum, to the city administration, and etc.

The spatial axis of the district is the road that does not separate, but unites parts of the territory into a single unit in the longitudinal direction. However, in the transverse direction, the division into two parts by ulitsa Mikutskogo and ulitsa Slavy is evident (Fig. 10).

Figure 9. Defining urban planning unit 4

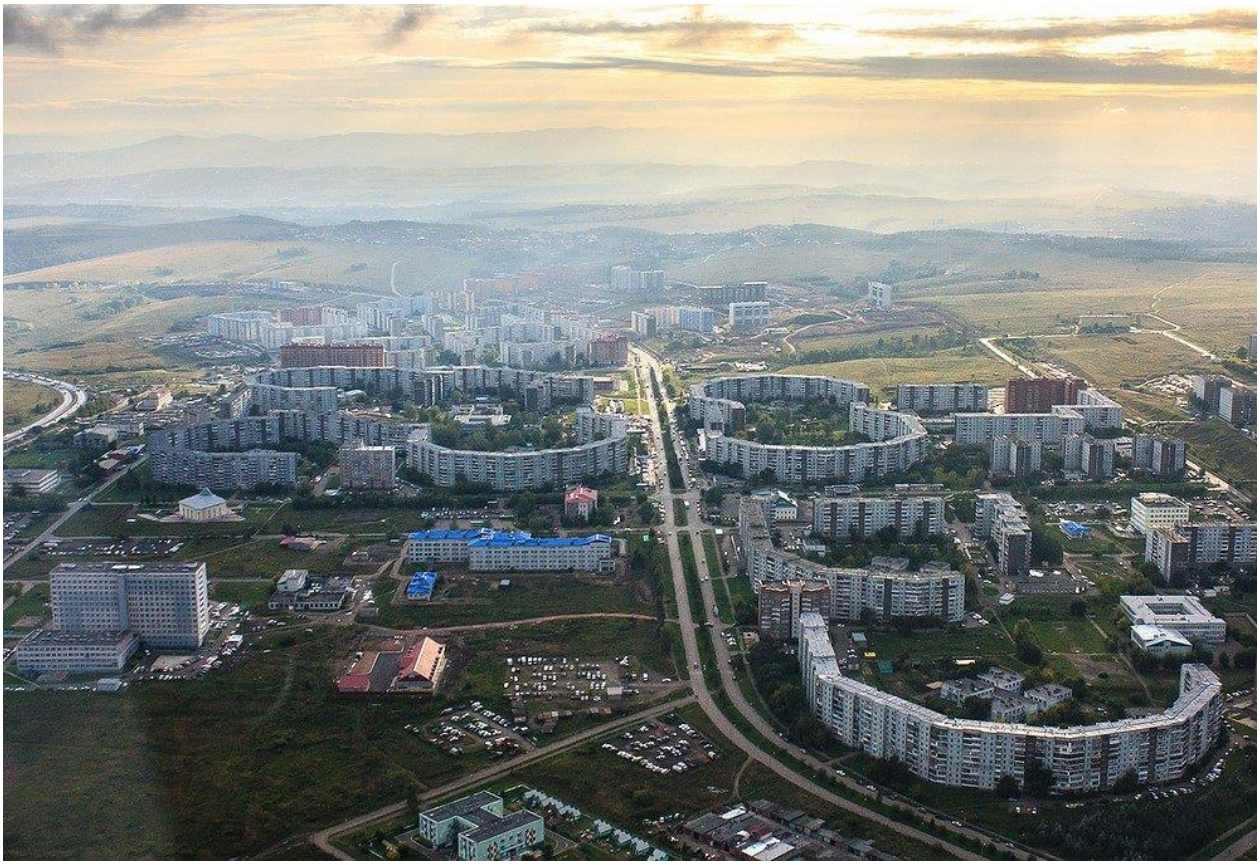

Figure 10. Panoramic view of Solnechny district. Urban planning unit 3. Source: http://images.esosedi.org/p_solnechnyiy_krasnoyarsk_obschiy_v/108547799/

The survey has revealed the sufficiency of public service objects within the territory, optimal connection of residential groups and neighborhoods with the main street. A striking characteristic is the location of the building on the terrain. From afar, the building array is perceived holistically, because it is obvious that the erection of residential groups is carried out in accordance with the adopted concept. This is manifested in plastic, color and spatial orientation of residential buildings. However, a survey of the interior spaces of the territory reveals some discontinuity and chaos of the building at the human scale. There is a lack of greenery, presence of vacant spaces between residential groups, lack of organized parking lots and garages. There is a fundamental contradiction in the scale: there is integrity at the level of residential area and unsystematic character at the level of residential areas. The residents mention good ventilation of the territories providing clean air, they describe their territory as prospective, and expect the saturation of urban space with pavilions, areas for communication, areas for sports and active leisure and amenities. *The residents describe large courtyard spaces and free adjacent territories, which are considered as a potential for locating leisure facilities for the community as main value of the district.* The program of transformation should be based on the general concept of district development and contain targeted recommendations for specific territories, taking into account the residents' preferences.

Observation of the available materials allows us to conclude that allocation of urban planning units and transformation of each of them by the means of flexible combining available resources of particular territory (the service industries, servicing technologies, management tools, management principles, financing methods, etc.) ensures shifting from the monocentric to polycentric model of urban organization. At the same time, the formation of the urban planning units self-sufficiency implies working out foresight development plans, which should be based on

the results of targeted consideration of naturally occurring conditions and problems in each specific case.

Such self-sufficient urban planning units should become a specific architectural and planning object. For specific areas of the city this approach ensures:

- system urban regulation based on a comprehensive accounting of local specific features and intensification of the territory use;
- interactive multifunctionality, in which public spaces are transformed into multisectoral complexes;
- structural flexibility, indicating the ability to respond to changing environmental conditions and the populations' needs;
- uniting the elements on the basis of a combination of centripetal and centrifugal functional processes for the purpose of mutual exchange of resources;
- informative integration, which allows obtaining fundamentally different qualities and density of the cultural environment, which provides additional attractiveness;
- stability of social development, in which different levels of interpersonal relationships and the way of life of different communities reveal regularities and interdependence of interaction;
- preservation of ethno-cultural identity as the result of immersion in specific historical and cultural experience of particular territory; the desire to preserve individuality and independence of the elements;
- innovation as a development strategy with the use of new technical and communicative approaches and technologies in working with citizens, new forms of organizational and financial activity, monitoring the needs and expectations of citizens to make life-correcting decisions, etc.;
- competitiveness as a manifestation of a new organizational form, in which visible work, competitiveness, cooperation of participants, external links and circulation of knowledge is the basis of dynamic development;
- priority of the quality of life indicators as the indicators of development (health and welfare of the population, the quality of the social sphere, environmental quality, readiness for change, etc.).
- The reviewed theoretical studies and practical work have shown that polycentrism for the modern city is an opportunity for a balanced development, due to the emergence of new growth points and centers of attraction. This means that traditional criteria for quantitative growth (population size, housing volumes, transport communications, introduction of social infrastructure facilities, jobs, etc.) fall into the background, yielding their dominant position to quality criteria. As the result, the growth paradigm will be complemented by the development paradigm, the conditions of "survival" will become the conditions for a "new quality of life", the principle of competition will be replaced by the principle of coordination.

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